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BRIARCLIFF MANOR, NY 10510

EXAMINER
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YANG, JAY

ART UNIT	PAPER NUMBER
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1786

NOTIFICATION DATE	DELIVERY MODE
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04/13/2011

ELECTRONIC

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/579,413  
Filing Date: February 20, 2007  
Appellant(s): BOERNER ET AL.

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Thomas J. Onka  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 01/31/11 appealing from the Office action mailed 10/14/10.

**(1) Real Party In Interest**

The Examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in interest in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The following is a list of claims that are rejected and pending in the application:

Claims pending: 1-10

Claims rejected: 1-10

**(4) Status of Amendments After Final**

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

**(5) Summary of Claimed Subject Matter**

The examiner has no comment on the summary of claimed subject matter contained in the brief.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

**(7) Claims Appendix**

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

**(8) Evidence Relied Upon**

JP 2003-007467 A	Tsuge et al.	01-03
US 2004/0076853 A1	Jarikov et al.	04-04
US 2003/0141809 A1	Furugori et al.	06-03

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections – 35 USC § 103***

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1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

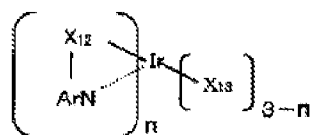
The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

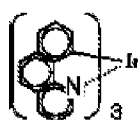
3. Claims 1-6 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuge et al. (JP 2003-007467 A) in view of Jarikov (US 2004/0076853 A1).

Tsuge et al. discloses an organic EL device comprising a light-emitting layer comprising a (light-emitting) host and dopant material between two electrodes ([Claim 1]). Tsuge et al. discloses that the anode is on a glass substrate ([0019]). Tsuge et al. discloses iridium complex dopants represented by the following formula:

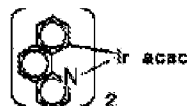
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([Claim 9], [Chemical formula 27]) where  $X_{12}$  = aromatic group, ArN = nitrogen-containing aromatic ring,  $n = 1-3$ ,  $X_{13}$  = acac ([0063]). Tsuge et al. discloses possible dopant embodiments with benzoquinoline ligands:



([0052]) and



([0061]). However, Tsuge et al. does not explicitly disclose the use of dibenzoquinoline ligands.

Jarikov discloses the use of dibenzo[f, h]quinoline as useful host material in the light-emitting layer of an organic EL device ([0161]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the benzoquinoline ligand of the iridium dopant in the organic EL device as disclosed by Tsuge et al to produce  $IrL_3$  or  $IrL_2(acac)$  where  $L$  = dibenzo[f, h]quinoline. The motivation is provided by the fact that Tsuge et al. discloses the possibility of a wide variety of nitrogen-containing aromatics groups as ligands in the generalized formula shown above, in addition to the fact that dibenzo[f, h]quinolines are widely known in the art for use in organic EL devices as disclosed by Jarikov.

Moreover, a benzoquinoline to dibenzoquinoline modification is an obvious variation (involving a minor addition of a fused benzene ring to benzoquinoline) that will produce a dopant species with similar chemical and physical properties such that the modification would have been predictable with a reasonable expectation of success.

4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuge et al. (JP 2003-007467 A) in view of Jarikov (US 2004/0076853 A1) and Furugori et al. (US 2003/0141809 A1).

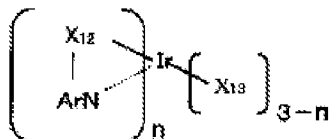
Tsuge et al. in view of Jarikov discloses the light-emitting device as claimed in Claim 6 as shown above. However, Tsuge et al. in view of Jarikov does not disclose that the further light-emitting material is a further iridium complex.

Furugori et al. discloses the use of plural metal complexes in the light-emitting layer with a metal = iridium ([0035]). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate further dopant iridium complexes to the light-emitting layer of the organic EL device as disclosed by Tsuge et al. in view of Jarikov. The motivation is provided by the fact that such further iridium dopants could allow further tuning of the light emission spectrum of the organic EL device that cannot be achieved if only a single iridium species is used as disclosed by Furugori et al.

### (10) Response to Argument

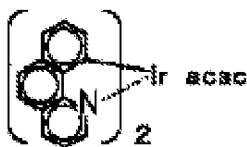
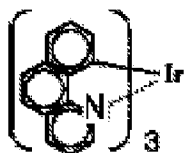
The Appellant argues on page 9 of the brief that 1) any teachings on iridium complexes from Tsuge et al. is unlikely and 2) insufficient motivation exists to produce the iridium complex comprising dibenzoquinoline ligands from the references.

Regarding the first point, the disclosure of Tsuge et al. is directed to the construction of organic EL devices and specifically discloses the use of iridium complexes of the following form:



as "doping agents" (Claim 9) in the light-emitting layer of the device. Thus, it is clear that one of ordinary skill in the art would easily be motivated to take into account the disclosure of Tsuge et al. for the use of iridium complexes as doping agents.

Regarding the second point, it should be noted that Tsuge et al. discloses a wide variety of possible embodiments generalized by the formula shown above including:

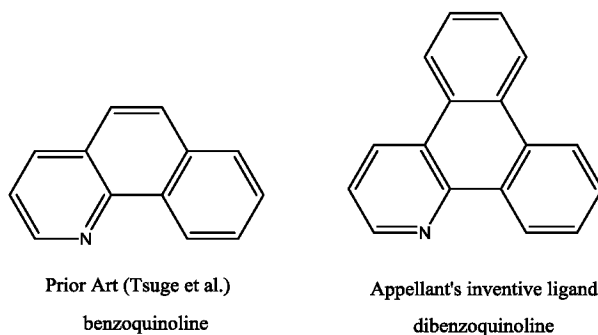


([0052] and [0061], respectively) where acac = pentane-2,4-dionate as claimed in Claim 9 by the Appellant. The explicit disclosure of Tsuge et al. thus differs from the claimed



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invention due to the presence of an extra fused benzene ring shown below in the dibenzoquinoline ligand:



It is the position of the Examiner that it would have been obvious to modify the benzoquinoline ligand as disclosed by Tsuge et al. to that of a dibenzoquinoline ligand in the iridium complex. The addition of the additional benzene ring is not a big leap or inventive change.

Although Tsuge et al. as mentioned by the Appellant does only explicitly discloses ligands that have at most 3 fused rings, it is clear that the range of iridium complexes is not limited to them as shown by the general formula shown above. Furthermore, the modification to arrive at dibenzoquinoline from benzoquinoline would only involve a homologous change in the original structure in the periphery (i.e., addition of an extra fused benzene ring) while maintaining the core three-ring fused structural unit. The way both ligands bond to the metal is the same. The resulting compound (i.e., dibenzoquinoline) would be 1) fully encompassed by Tsuge et al.'s general formula and 2) expected to have similar chemical and physical properties without destroying the light-emitting properties of the iridium complex.

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It should be noted that the teaching of Jarikov et al. is primarily used as evidence that dibenzoquinolines are known chemical compounds; it is not essential to the derivation of the Appellant's invention (i.e., iridium complex comprising dibenzoquinoline ligands) from the primary reference (Tsuge et al.). This shows that one having ordinary skill in the art would have access to such materials in general.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/J. Y./

Examiner, Art Unit 1786

Conferees:

/D. Lawrence Tarazano/

Supervisory Patent Examiner, Art Unit 1781

/ROBERT J. WARDEN, Sr./

Supervisory Patent Examiner, Art Unit 1700